



**Town of
Cumberland,
Rhode Island**

2016 Water Supply
System Management
Plan Update

**EXECUTIVE
SUMMARY**

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**Cumberland Water
Department**

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EXECUTIVE SUMMARY

Goals

Water Supply Management Goals for the Cumberland Water Department (CWD) and its water system embody fundamental supply, demand, and financial management objectives, consistent with the Water 2030. These goals are:

1. Provide an adequate and safe water supply for domestic, commercial, and industrial development of the Town of Cumberland, Rhode Island (Town of Cumberland), the efficient use of this resource consistent with the Town of Cumberland's Comprehensive Community Plan and those of the State of Rhode Island.
2. Protect the ground and surface water resources of the CWD by water conservation measures, limiting the wasteful and unnecessary use of water, establishment of water rates that discourage water waste, promote land use, watershed and aquifer protective measures that ensure long-term protection of reservoirs, streams, rivers, and groundwater of the Town of Cumberland and for downstream users.
3. Manage the water system in a financially sound Enterprise System method allowing for necessary capital improvements, maintenance and operation, and the employment and training of personnel who are responsible for the day-to-day system operation, quality of its water supply and level of service to the community.
4. Provide Emergency Management for the water system by coordination of efforts with land use planning activities near or proximate to water supply sources. Review and update response plans for hazardous material spills near reservoirs, streams, or aquifers with each of the local fire districts, police, and public works departments, and other emergency response agencies of the State. Preparation of emergency contingency plans for large scale or localized water supply contamination. Respond to water system leakage or breaks in a planned and organized method by maintenance of equipment and required spare parts. Maintain an active backflow prevention program. Maintain an active water quality monitoring program.

The foregoing objectives cover a broad spectrum of Water Supply System Management goals that the CWD has integrated into the operation of its water system.

Introduction

This Water Supply System Management Plan (WSSMP) has been prepared as required under Rhode Island General Laws 46-15.3, as amended and titled "The Water Supply System Management Planning Act" (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the Rhode Island and Providence Plantations RI Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning, October 2002, as amended to implement the provisions of the Act.

Under this legislation, the Town of Cumberland – Cumberland Water Department (CWD), as a water purveyor supplying over 50 million gallons (MG) of water per year, is responsible for the preparation and adoption of a WSSMP. It is also required that the CWD review and update this WSSMP at least once every five years, or as otherwise stipulated in the Regulations.

This WSSMP has been prepared to provide the proper framework to promote the effective and efficient conservation, development, utilization and protection of the natural water resources of the State, as utilized by the CWD. Further, the overall goals shall be consistent with Water 2030. The purpose of this WSSMP is to outline the objectives of the WSSMP process for the CWD, and to serve as a guide to employ the proper decision making processes.

The WSSMP contains a detailed description of the water system and includes the policies and procedures related to the general operation and management of the water system. The Emergency Management section relates to the

vulnerability assessment of the water system for use in emergency planning. It shall be incumbent upon the CWD to implement the recommendations and procedures outlined in this WSSMP in order to comply with the overall requirements of the Act.

Background

The Town of Cumberland is operated under the Town Council/Mayor form of government, wherein the council enacts local legislation and the Mayor, elected by the voters, executes the laws and the administration of the Town Government in accordance with the Town Charter. The CWD was established by legislation of the General Assembly of the State of Rhode Island in 1893. In 1929, the Town of Cumberland, Rhode Island (Town of Cumberland), utilizing Sneece Pond as its supply, installed a pump station, a 0.35 MG tank, and transmission and distribution piping in and around Nate Whipple Highway and Mendon Road. By the early 1940's, the system had been expanded to service the area of Cumberland Hill, and also to the adjoining Town of Lincoln to serve the village of Albion and the Berkshire Hathaway Mill Complex. In the 1950's, with the formation of the Lincoln Water System, these portions of the water system were turned over to Town of Lincoln. An emergency interconnection is still maintained with the Town of Lincoln to this day.

In the 1950's the CWD constructed a water treatment plant (WTP) at Sneece Pond and expanded its service area to include Ashton, Berkley, Upper Lonsdale, Monastery Heights, Diamond Hill, Arnold Mill and Grants Mill areas of Town. Note that this treatment facility was upgraded in 2007-2008 to improve compliance with the newer, and stricter, water quality requirements in place since the plant's original construction. In the mid to late 1960's and 1970's the Town of Cumberland developed new well supplies in Cumberland Hill, Arnold Mills and at Martin and Lennox Street. These wells have since been abandoned due to contamination from a neighboring site. Wells were installed at the Manville and Abbott Run well sites in 1968. Additional wells were installed at the Abbott Run well site in 1988 and 1992 and satellite wells were installed at the Manville well site in 1995. In 1955, the Marshall Avenue Pump Station was constructed. This station, forming the interconnection with the Pawtucket Water Supply Board (PWSB), is designed to boost water purchased from Pawtucket into the CWD system. Upgrades to this station were performed in the early 1990's to increase overall capacity and reliability, and again in 2012 to improve energy efficiency at the current, lower pumping requirements. The CWD currently relies on the wholesale interconnection with PWSB as a source of supply.

In 2015, the CWD placed into service a gravity (non-pumped) interconnection between the Town of Cumberland and the Woonsocket Water Division (WWD). This newly constructed interconnection has allowed the CWD to help satisfy consumption during peak demands as well as offset wholesale water delivered from the PWSB, which requires pumping to reach the higher elevations at the north end of the Town of Cumberland.

Water System Description

The CWD currently supplies drinking water to approximately 22,564 residents using five different water sources. These sources include:

1. Surface Water from Sneece Pond;
2. Groundwater from the Abbott Run Wells;
3. Groundwater from the Manville Wells;
4. Purchased water from the PWSB; and
5. Purchased water from the WWD.

Recently, the CWD's supply capacity from the Town of Cumberland's own sources have greatly increased. This has led to a substantial cost savings to the department and the ability to fund infrastructure and capital improvement projects, without large increases in the water rates. CWD has found that for each additional 100 gallons per minute (GPM) which is produced from its existing well sites, there is a \$200,000 per year savings. This savings has ranged

from \$350,000 to \$400,000 annually. The table below illustrates the amount of water obtained from CWD's own sources of supply and the amount of water obtained from a combination of the PWSB or WWD over the last 10 fiscal years (FY).

Table 1: Total Consumption by Fiscal Year

YEAR	2007	2008	2009	2010	2011	2012	2013	2014	2015
Purchase (MG)	549.56	602.17	431.72	420.02	329.35	145.72	149.50	193.00	278.90
Production (MG)	461.01	477.10	528.11	538.54	502.97	666.40	651.00	610.01	598.49
Total (MG)	1010.57	1079.27	959.83	958.56	832.32	812.12	800.5	803.01	877.39

Over the past several years, approximately 20-55% of source water was obtained from the PWSB or WWD. The newly constructed interconnection with the WWD, which was partially funded through the Rhode Island Water Resources Board Emergency Interconnection Program, has allowed CWD to help satisfy consumption during peak demand period. The CWD is currently in negotiations with the PWSB on a new long-term contract and agreement.

CWD Sources:

The CWD presents the monthly withdrawal of each source of water, including the volume purchased from the PWSB and WWD, in their annual report submitted to the state. The monthly withdrawal volumes for Sneece Pond, the Manville Wells, and Abbott Run Wells, along with the monthly volume purchased from the PWSB and WWD in FY 2015, is presented in the Figure 1, below.

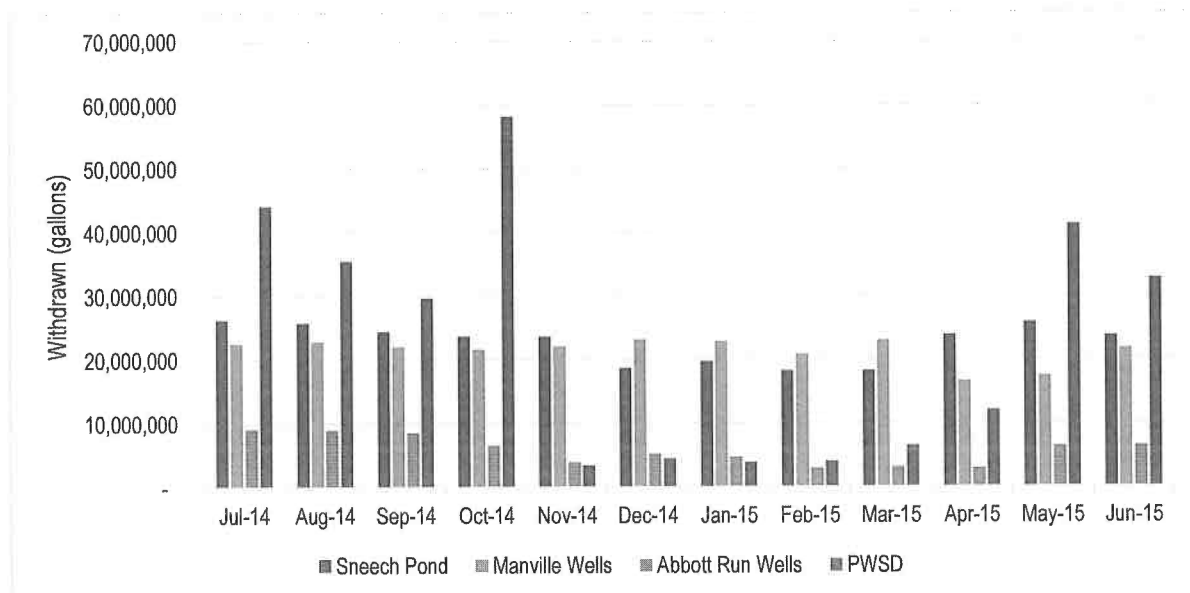


Figure 1: Monthly Withdrawal Volumes for Fiscal Year 2015

Table 2, below, presents the yield from each of the supply sources. There is a contract for PWSB to supply water to Cumberland although it is expired. However, both parties continue to honor the contract and Cumberland continues to purchase water under the terms of the original contract. Once CWD has constructed its new sources, PWSB and CWD plan to enter into a new agreement. CWD has the ability to purchase as much as 4.5 million gallons per day (MGD) through the Marshall Avenue Pumping Station. The capacity of CWD pumps and distribution mains hydraulically limits the amount of water that can be purchased from PWSB. CWD is coordinating with the PWSB and hopes to execute a new wholesale agreement in the near future. CWD and WWD have recently completed a Memorandum of Understanding (MOU), which outlines the terms and conditions of emergency and wholesale purchases between the two communities for the next five years. The MOU has been reviewed and signed by the WWD's legal counsel.

Table 2: Water Supply Production

SUPPLY SOURCE	YIELD (MGD)	CAPACITY (MGD)
Sneech Pond	0.88	1.2
Manville Well 1 & Satellite Well	0.43	1.0
Manville Well 2 & Satellite Well	0.37	1.0
Abbott Run Well 1	0.0	0.0
Abbott Run Well 2	0.0	
Abbott Run Well 3	0.30	0.64
Marshall Avenue Pump Station (Purchased from PWSB)	0.32	4.5
Highland Corporate Park Station (Purchased from WWD)	0.0	2.0
Available Production:	2.3	10.34

Capacity: The amount of water that an individual site is either permitted for or capable of producing.

Yield: The amount of water that is actually produced at an individual site based on an annual average.

Surface Water and Groundwater Sources:

Sneech Pond is a natural body of water located in the northwest section of the Town of Cumberland, adjacent to Nate Whipple Highway. The surface area of the reservoir is approximately 46 acres, with a safe yield of 0.75 million gallons per day (MGD). Source water from Sneech Pond is treated using a conventional process, which includes pre-chlorination, alum coagulation, mixing and flocculation, sedimentation, filtration, post chlorination and final pH adjustment.

The CWD draws groundwater from the Manville Wells and the Abbott Run Wells. In recent years, the wells have undergone an aggressive reconditioning program that has increased their yield.

Table 3: CWD Groundwater Sources

WELL	DEPTH (FT)	DIAMETER (INCH)	WELL TYPE
Abbott Run Well 1	77.9	18	Gravel Packed
Abbott Run Well 2	80	8	Gravel Packed
Abbott Run Well 3	77.9	12	Gravel Packed
Manville Well #1	85.5	18	Gravel Packed
Manville Well #1 (Satellite)	81	12	Gravel Packed

In 2012, the CWD began evaluating alternative sources of water supply and identified two new potential groundwater sources. Permit applications for the development of these sites were submitted in 2015 and conditional approvals were received in 2016.

Infrastructure Components:

The system operated by the CWD includes critical infrastructure components necessary to deliver water to their customers. Infrastructure components include treatment facilities, transmission/distribution piping, booster pump stations, well pump stations, and storage facilities. Master meters and distribution meters are also maintained by the CWD.

As previously mentioned, water from Sneeched Pond is treated through a conventional treatment process at the Sneeched Pond WTP. This WTP is the only treatment facility in the system; however, chemical addition is performed at the Abbott Run Wells and at Manville Well #1 and Manville Well #2.

Sneeched Pond Water Treatment Plant

The Sneeched Pond Water Treatment Plant (WTP) is the major surface water treatment facility for the CWD. The plant utilizes conventional processes for water treatment and was designed with a 1.5 MGD capacity. The pumping and treatment process includes chemical addition, raw water pumping, rapid mixing, flocculation, sedimentation, sand filtration through an automatic backwash filter bed, a clearwell for disinfection, post-treatment chemical addition and high lift pumping to the distribution system. The treatment process is depicted in Figure 2, below.

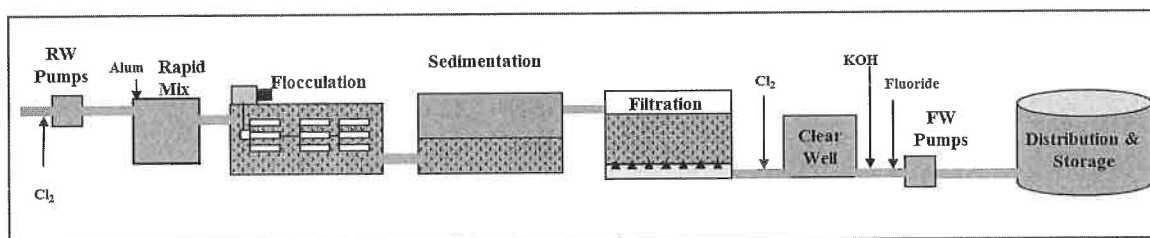


Figure 2: Conventional Treatment at the Sneeched Pond Water Treatment Plant

Well Pump Stations

Additionally, the CWD has well pump stations at the Abbott Run and Manville well sites. The pumping capacity for these stations are presented in Table 4, below.

Table 4: Well Pumping Stations

PUMPING STATION	CAPACITY
Abbott Run #1 Well	0.30 MGD
Abbott Run #2 Well	0.30 MGD
Abbott Run #3 Well	0.30 MGD
Manville Well #1	1.0 MGD
Manville Satellite Well #1	
Manville Well #2	1.0 MGD
Manville Satellite Well #2	

Chemical addition is performed at each of the well pumping stations, before water enters the distribution system. The treatment methods for each of the well stations can be found in Table 5, below.

Table 5: Chemical Feed Systems at Well Pumping Stations

PUMPING STATION	CHEMICAL FEED SYSTEMS
Abbott Run	Chlorine (Cl ₂), Sodium Fluoride (NaF), and Potassium Hydroxide (KOH)
Manville Well #1	Potassium Hydroxide (KOH)
Manville Well #2	Potassium Hydroxide (KOH)

Distribution System

The transmission and distribution system consists of upwards of 137 miles of asbestos cement, cast iron, ductile iron, and polyvinyl chloride (PVC) water mains, ranging in size 6-inch to 20-inch diameter. The system is relatively young, with the majority of water mains installed in the 1940's through the 1960's. New and replacement main installations consist predominately of cement lined ductile iron (CLDI) and PVC pipe materials.

Storage Facilities

There are five water storage facilities in the CWD's system. They include the Monastery (Palomino) Tank, Thompson Hill Tank, Coppermine Tank, Fisher Road Tank, and the Highland Park Tank. It should be noted that the Fisher Road Tank is in the process of being replaced and the replacement tank will be brought into service in 2017

Table 6: Water Storage Facilities

WATER STORAGE TANK	CONSTRUCTED	TYPE	CAPACITY (MG)	OVERFLOW EL. M.S.L. (FT)
Monastery	1969 ¹	Steel Reservoir	3.2	371
Coppermine	1969 ¹	Steel Reservoir	3.13	481
Thompson Hill	1958 ¹	Elevated Steel – Torosphere	0.75	371
Fisher Road ²	1989	Glass Lined – Bolted	0.65	487
Highland Park	1995	Steel Standpipe	3.00	481
Total Storage (MG):			10.66	

¹ Construction dates were taken from the 2003 CWIRP.

² Fisher Road Water Storage Tank is currently in the process of being replaced. The new tank will remain the same size but will be a wire-wound prestressed concrete tank (AWWA D110 Type III).

With a total storage of 10.66 MG, the system could supply the Town of Cumberland for approximately 4.7 days at average day demand conditions. The system could supply the Town of Cumberland for approximately 2.3 days at maximum day demand.

Pumping Stations

The CWD has six functioning booster pumping stations. As seen in Table 7, below, the Marshall Avenue Station has the largest capacity. This pump station was recently upgraded and serves as the interconnect with PWSB. The Lippit Estates Pump Station is off-line with no immediate plan for re-instatement, and therefore is not included in the table.

Table 7: Pumping Stations

PUMPING STATION	CAPACITY
Marshall Avenue	4.50 MGD
Angell Road	1.00 MGD
Girard Road	1.90 MGD
Sneech Pond	1.50 MGD
Fisher Road	0.60 MGD
Mendon Road Booster/P.R.V.	0.75 MGD

There are six master meters in the system located at Manville Well #1, Manville Well #2, Abbott Run Wells, Sneech Pond WTP, and the interconnections with PWSB and WWD. All customers serviced by the CWD are metered, except for 14 locations at the Town of Cumberland owned facilities. The field conditions at these facilities complicate the installation of meters, with the majority of them requiring the installation of a metering pit. All residential customers are equipped with Sensus meters and a fixed base Automatic Meter Reading (AMR) system. This is the result of a system wide meter replacement program, started in 2009, consisting of approximately 7,900 meters. The installation of the new meters and AMR system has greatly improved the efficiency of the billing process at the CWD.

Interconnections

As mentioned, the CWD maintains interconnections with the PWSB and WWD for wholesale water purchase purposes and an emergency interconnection with the Town of Lincoln. The interconnection with the PWSB is located at the Marshall Avenue Pump Station, in the southern portion of the system. The recently improved connection can supply up to 4.5 MGD. There is a contract for PWSB to supply water to Cumberland although it is expired. However, both parties continue to honor the contract and Cumberland continues to purchase water under the terms of the original contract. Once CWD has constructed its new sources, PWSB and CWD plan to enter into a new agreement. The interconnection with WWD is via the Highland Corporate Park Station, located in the northwest of the system. The newly constructed connection can supply up to 2.0 MGD and has allowed the CWD to satisfy consumption during peak demand periods. The emergency interconnection with the Town of Lincoln is located in Albion Road but has not been used.

Service Area

Geographic Area

The CWD's water service area does not include the entire Town of Cumberland, since the Valley Falls area is served directly by the PWSB. The area that is serviced by the CWD is divided into five pressure zones, each of which operates independently of the others.

There continues to be a portion of the service area that depends primarily on private well systems. The majority of these private wells are associated with single-family residences; however, some wells provide water to commercial

and industrial facilities within the service area. These private well systems and their service population would also be eligible to be served by the CWD.

Water Services History

In the period between 2005 and 2015, the CWD has seen an increase in total population served (19,938 in 2005 to 22,654 in 2015). As seen in the table below, the total number of service connections also increased with a 7% increase in the number of residential service connections. The number of commercial/industrial/government service connections decreased approximately 60% in the same time period.

Table 8: Water Service History

TYPE	2005	2015	% CHANGE
Total	7,941	8,267	4
Residential	7,434	7,957	7
Commercial/Industrial/Government	507	310	(60)

Population and Projections

As mentioned, the CWD's service area does not include the entire Town of Cumberland. In 2015 the population served by the water system was approximately 22,654, or about 66% of the total population of the Town of Cumberland (34,301 based on the 2015 estimate by the US Census). The CWD currently has 8,267 total service connections with 8,253 metered services. There are approximately 2.74 people per service connection. It should be noted that approximately 5,673 people in the Valley Falls area are serviced by the PWSB with approximately 5,974 people serviced from private wells in the Town of Cumberland. It is estimated that the population served in 2020 will be approximately 24,299 and 25,944 in 2025.

Historic population growth in the Town of Cumberland has been at a greater rate than that of the State as a whole as exhibited in Table 9 (Source: U.S. Census).

Table 9: Cumberland Population Growth

Year	TOWN OF CUMBERLAND			STATE-WIDE		
	2000	2010	2015*	2000	2010	2015*
Population	31,840	33,508	34,301	1,048,319	1,052,567	1,056,298
% Change	-	+5.2%	+2.7%	-	+0.4%	+0.35%

*Note: 2015 populations are from the July 1, 2014 population estimate from the U.S. Census Bureau

The following tables provide historic socio-economic indicators for the Town of Cumberland and geographic distribution of the population by U.S. Census Tract. The 2000 and 2010 U.S. Census were consulted for both tables.

Water Use

CWD provides service to residential, commercial, industrial, and governmental users. On average, the CWD supplies approximately 2.4 MGD of water. The peak daily demand has historically been as high as 7 MGD, but has declined over the last several years due in part to the loss of several large commercial and industrial customers. Historically, residential use consumes the majority of the water supply. In Fiscal Year (FY) 2015, the residential consumption was approximately 82% of the total supply usage. Commercial use was approximately 10% and industrial and government use were approximately 5.5% and 3%, respectively. Below shows water use data by category.

Table 10: Historical Usage Summary by User

	FY2005 USAGE (MGY)	FY2010 USAGE (MGY)	FY2015 USAGE (MGY)
Residential	598.58	527.00	582.69
Commercial	84.05	38.00	64.70
Industrial	44.05	10.00	39.31
Government	15.85	20.00	21.78

There are 10 major users that each consume more than 2.50 MG per year. Together, these 10 large users account for approximately 10% of the total system demand. Current average day demand is 2.4 MG with a maximum day demand of 4.3 MG. Under projected water use for the 5- and 10-year planning periods, it is expected that the average day demand will be about 2.20 MG and 2.30 MG, respectively. These projections are based primarily on population projections and do not account for significant water savings potentially realized through demand management strategies. These projections also assume the loss of commercial and industrial major users, which is predicted to continue in the planning period.

Average Daily Demand

The average daily demand is determined by the amount of water which is consumed within a distribution system over a 24-hour period. All water that is consumed by residential users over a 24-hour period is considered the residential average day demand. Average daily consumption per resident is expressed in gallons per capita per day (GPCD) and is calculated by dividing the residential average day demand by the estimated population served. Over the past decade, CWD's average GPCD has ranged from 75.9 to 62.6. CWD encourages water conservation through public education and availability of water conservation kits, which contribute towards attaining CWD's goal of 60 GPCD for the water system. The State's target is 65 GPCD. As previously mentioned, residential use accounts for the majority of water consumption. The table below shows a more detailed analysis of residential water use.

Table 11: Residential Water Use (2005 – 2015)

FISCAL YEAR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual Use (MG)	529	597	614	561	596	527	523	526	492	509	582
Average Daily Use (MG)	1.45	1.64	1.68	1.54	1.63	1.44	1.43	1.44	1.35	1.39	1.59
Service Connections	7434	7751	7820	7867	7864	7906	7914	7742	7856	7898	7957
GPCD	68.1	74.4	75.8	71.2	75.9	66.5	64.3	67.6	62.6	61.8	70.2

*Note: There are approximately 2.74 people per service connection.

It should be noted that 2015 was a very dry spring and was an abnormally high use year. Early 2016 saw a slight decrease from 2015. The Town is anticipating a downward trend due to a water rate increase. CWD also continues to provide water conservation education, as outlined later in this report.

Over the previous six years, 2009-2015, the CWD has exhibited a significant reduction in the volume of unaccounted water volume. In 2014 and 2015, the unaccounted-for water was 10%, down from 31% in 2009, and satisfying the goal of 15% identified in the Water 2030. The CWD, in consideration of maintaining these percentages, is committed to further reducing this unaccounted water volume. As of 2007, the CWD had a five-year schedule for the implementation and development of the following programs:

- main break tracking system
- tracking of flows from the annual flushing program
- leak detection program

Since 2007, the CWD has developed a main break tracking system and implemented its use. The CWD plans on tracking flows from the annual flushing program during the current year. The CWD performs leak detection on an annual and ongoing basis. The CWD will strive to continue to achieve the recommended 15% unaccounted water for this next five-year period.

Water Quality Protection

Water quality protection is an important aspect to the CWD, as the sources of supply continue to be affected by growth, potential pollution sources, and increases in residential demand. The water supply for the CWD is obtained from a combination of surface and groundwater sources. The surface water supply consists of Sneece Pond and the groundwater sources are wells located near the Blackstone River and Abbott Run Brook. In addition, the PWSB, the primary wholesaler of water to the CWD, has surface and groundwater supply sources partially in the Town of Cumberland along Abbott Run Brook. The CWD and PWSB are both working in conjunction with the Town of Cumberland's Planning Department on the development of zoning regulations for a Drinking Water Quality Protection Overlay District for sources of water supply within the Town of Cumberland.

Recent System Improvements

From 2009 to 2016, CWD has initiated many capital improvements to improve water quality and increase both system capacity and efficiency while system demand has grown. Major projects completed during these years include:

- Completion of an interconnection with the WWD;
- Cleaning of transmission mains on Diamond Hill Road, Hillside Road, and Mason Drive;
- Replacement of all water meters system-wide;
- Installation of a fixed based AMR system;
- Piping upgrades in Nate Whipple Highway in the vicinity of the Sneece Pond WTP;
- Replacement of the 16-inch discharge main at the Marshall Avenue Pumping Station;
- Installation of water main loops in several areas where dead ends led to poor water quality;
- Reconditioning of the Manville Wells;
- Abbott Run Well #3 reactivated as a daily source of supply and reconditioned to improve capacity;
- Abbott Run Well #1 rehabilitated and reactivated as a source of supply;
- New energy efficient motors and variable frequency drives installed as several of the CWD's well and booster stations;
- Installation of emergency generators and automatic transfer switches at Manville #1 Well Station, Manville #2 Well Station, Abbott Run Well Station, and Girard Road Pump Station; and
- Test wells, pumping tests and permitting completed at two potential groundwater supplies.

Each of these projects has been completed. Prior to the completion of the main cleaning project, CWD's customers in the northern section of the distribution system experienced discolored water on a daily basis during peak demand periods. Discolored water events have substantially decreased due to the completion of the main cleaning project and

increased supply capacity from CWD's wells and the Woonsocket interconnection. The completion of the water meter replacement and AMR project have allowed CWD to implement quarterly billing which in turn has led to improved cash flow for the department. Increased supply capacity and increased cash flow have allowed CWD to complete the infrastructure improvements noted above while improving operational efficiency over the last six years.

In addition, as of 2017, the CWD is in the construction phase of some additional capital improvement projects including:

- Replacement of the Fisher Road Water Storage Tank, including a passive mixing system and new Supervisory Control And Data Acquisition (SCADA) system control panel; and
- Installation of licensed frequency radio hardware, antennas, SCADA panels, and electrical infrastructure at the Sneece Pond WTP, Fisher Road Water Storage Tank, Fisher Road Booster Pump Station, and the Coppermine Water Storage Tank.

The CWD has also completed the design of upgrades to the Girard Road Booster Pumping Station and plans to publically bid the project and begin construction in the near future.

In conjunction with the development of this WSSMP, the CWD also completed an update to the water system hydraulic model which helped to identify system deficiencies for inclusion in the CWD's CWIRP.

Supply & Demand Management

The CWD has taken an active stance to protect its existing and future water supply sources. Presently, the Town of Cumberland owns the majority of properties abutting its surface water supply at Sneece Pond and is investigating the purchase of additional property surrounding each of their sources on an ongoing and continuous basis.

Projected Future Demands

The Town of Cumberland's Comprehensive Community Plan provided projections for population growth in the Town of Cumberland. This population growth was considered in future water use demands. Several critical assumptions were made to develop these projections through the year 2036, and they include:

- The total Town of Cumberland population in 2035 is 37,548 people.
- A population of 8,314 people are served directly by the PWSB (Valley Falls) or by private wells in 2035. It is estimated that 3,333 people who are currently served by private wells will be added to the public water system in the 20-year planning horizon.
- An average day demand of 2.54 MG in 2035.

Available Water and Alternative Supplies

It is the overall objective of the CWD to ensure the availability of an adequate supply of potable water to meet the existing and future demands of its customers. Future demands can be met through the increase production from the current sources of supply and the development of the two new identified well sites.

Although the Sneece Pond WTP has the capacity of producing 1.5 MGD, safe yield from Sneece Pond is estimated at 0.75 MGD. All three of the Abbott Run Wells are rated to produce 0.3 MGD. Combined, the Manville Wells have a potential yield of 1.0 MGD. The CWD also has the ability to purchase up to 4.5 MGD of water from the PWSB and 2.0 MGD from the WWD.

Demand Management

In August 2012, the CWD developed a Water Efficiency and Demand Management Strategy report, which outlined the current per capita water use, efficient indoor and outdoor water use methods and strategies, accounting for non-billed water, leakage reduction, and metering goals. Through these strategies, the CWD has been able to reduce the demand and effectuate efficient use of water resources.

As mentioned, the CWD has greatly reduced the amount of unaccounted-for water. Several programs have been implemented to help better document areas where water is used but not billed. These include methods to quantify water used during flushing programs, street sweeping, Fire Department training, main breaks, leakage, and construction sites.

Conservation

Water conservation initiatives are the methods, procedures, and devices designed to promote efficient use of water and eliminate the waste of water. The CWD has implemented and maintained several programs to promote the conservation of water including the Residential Retrofit Program (RRP). The CWD has educational information and water conservation devices such as toilet dams, low flow showerheads, and faucet adapters (residential retrofit kits). Information regarding the use of these devices is fairly well publicized. The program is structured such that the CWD currently provides its customers with kits on a request basis and the kits may be picked up at the main office on Nate Whipple Highway. CWD keeps a stock of the retrofit kits and distributes 1-2 per year. The kits are suggested to customers that have high water bills and indicate that they have older plumbing and fixtures. CWD does not get requests for the retrofit kits.

Currently, the CWD has public education programs in place to encourage the conservation of water. Information relating to water conservation is available upon request from the CWD and free leak detection surveys are available to its customers. The CWD also performs elementary and middle school educational programs. The CWD is evaluating the development of an active system-wide public education program, specifically done in conjunction with the billing program. The CWD relies upon advertisements, and public service announcements in the local newspapers for notification of customers regarding flushing, water bans, or user restrictions.

Financial Management

The CWD has recently contracted with a consultant to perform a cost-of-service water rate study. The objectives of the cost of service study are:

1. Examine the recent historical performance of the existing water rate structure;
2. Provide a projection of future operating budgets, including the budgetary impacts of expected capital upgrades;
3. Evaluate the rate impacts of debt financing and cash financing of the proposed capital upgrades; and
4. Use both historical consumption and non-consumption revenue data to calculate water usage charges that generate revenues sufficient to fully fund the Town of Cumberland's water operations, make needed capital investments, and maintain adequate reserve fund balances.

The current water consumption charge is:

- Step 1: 0-50,000 Gallons – \$3.1846/1,000 gallons
- Step 2: 50,000-200,000 Gallons – \$4.4639/1,000 gallons
- Step 3: 200,000 + Gallons – \$4.7436/1,000 gallons

Capital Improvement

A five-year Capital Improvement Plan was adopted along with the department's FY 2016 annual operating budget by the Town of Cumberland's Town Council. A detailed 5-year and 20-year improvement plan was developed and included in the CWD's Clean Water Infrastructure Replacement Plan (CWIRP). Some of the projects span over several years due to the design and construction timelines. These projects are necessary for the CWD to continue to maintain and improve their system. Projects included in the 5-year improvement plan prioritize infrastructure that requires immediate attention. In addition, the CWD has put a strong focus on developing the additional groundwater sources and reducing their purchase of water from neighboring systems. Projects included in the 20-year improvement plan do not require immediate attention and focus on tank rehabilitation, pump station rehabilitation/replacement, and further improvements to the distribution system.

Emergency Management

The Emergency Management section of the Plan establishes the responsibilities and authority within the CWD for responding to most probable emergencies and outlines specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and risks. The procedures outlined are consistent with the goals of the Water 2030. It is also intended that this document provide guidance to ensure that the primary aspects of recovery from an emergency are addressed in an organized manner to aid in an efficient response and in maintaining drinking water quality and quantity.

With a total storage of 10.66 MG, the system could supply the Town of Cumberland for approximately 4.7 days at average day demand conditions. The system could supply the Town of Cumberland for approximately 2.3 days at maximum day demand.

The CWD has established procedures to follow in the event of an emergency regarding critical valves to close, well operation sequence, monitoring of chemical levels throughout the Town of Cumberland, and the monitoring of water quality in the system.

As previously mentioned, the CWD maintains three interconnections with neighboring water suppliers and retains approximately 4.7 days' worth of water at average day demand conditions in its storage facilities. Both the interconnections and stored water are available for use during an emergency.

Drought Management

A drought event is not immediate, but occurs over a period of time. Generally, a drought is defined as a continuous period of time in which rainfall is significantly below the norm for a particular area. Historically, the CWD has not been affected by drought conditions, and the system's wells and the Sneece Pond Reservoir have all recovered during past events. The CWD maintains active receiving interconnections with the PWSB and WWD, and an emergency interconnection with the Lincoln Water Department, all of which could aid the CWD in times of drought or emergency.

Indicators of the five phases of drought were identified in the Drought Response Plan developed for the CWD, dated February 2008. The indicators for each phase of drought are presented in Table 12, below. Indicators of a drought can be witnessed through changing levels of the reservoir or groundwater level or from notifications from the PWSB or the Rhode Island and Providence Plantations RI Water Resources Board (RIWRB).

Table 12: Drought Phase Indicators

DROUGHT PHASE	INDICATORS
Normal	<ul style="list-style-type: none"> • Normal Operations
Advisory	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 20% capacity • Decrease in groundwater level by roughly 10% capacity • Notification from Water Resources Board and PWSB • Increase in daily pumpage and consumption from 2.5 MGD to 3 MGD
Watch	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 40% capacity • Decrease in groundwater level by roughly 20% capacity • Notification from Water Resources Board • Increase in daily pumpage and consumption from 3 MGD to 4 MGD
Warning	<ul style="list-style-type: none"> • Decrease in groundwater level by roughly 30% capacity • Notification from Water Resources Board • Increase in daily pumpage and consumption from 4 MGD to 4.5 MGD
Emergency	<ul style="list-style-type: none"> • Decrease in reservoir level by roughly 60% capacity • Decrease in groundwater level by roughly 50% capacity • Notification from Water Resources Board • Notification from PWSB

Coordination

The CWD maintains close working relationships with the PWSB, the WWD, and the Town of Lincoln in regards to the interconnections and the potential need for additional emergency supply, specifically in times of drought. This WSSMP was developed in conjunction with the Town of Cumberland's Comprehensive Community Plan 2016-2036, and is consistent with the aspects of that plan.